

I Claim:

1. A semiconductor laser, comprising:

a vertical resonator formed by reflectors;

a photon-emitting active layer disposed between said reflectors;

at least one current diaphragm for laterally circumscribing a current flowing through said photon-emitting active layer; and

mode-selective regions extending in a vertical direction and laterally delimit said vertical resonator.

2. The semiconductor laser according to claim 1, further comprising a mesa and one of said reflectors is formed in said mesa.

3. The semiconductor laser according to claim 2, wherein said mesa has a diameter of $> 10 \mu\text{m}$.

4. The semiconductor laser according to claim 1, wherein said current diaphragm is formed from an oxide.

5. The semiconductor laser according to claim 1, wherein said current diaphragm defines a current aperture having a given diameter of $> 3 \mu\text{m}$.

6. The semiconductor laser according to claim 5, wherein said current diaphragm has a diameter of $> 4 \mu\text{m}$.

7. The semiconductor laser according to claim 5, wherein said mode-selective regions define an inner opening being larger than said current aperture.

8. The semiconductor laser according to claim 1, wherein said mode-selective regions have a conductivity being less than a conductivity of said vertical resonator along a resonator axis.

9. The semiconductor laser according to claim 1, wherein said mode-selective regions are implantation regions.

10. The semiconductor laser according to claim 9, wherein vertical resonator has an edge area and said mode-selective regions extend in said edge area and a surrounding region of said edge area of said vertical resonator.

11. The semiconductor laser according to claim 1, wherein said current diaphragm is at least two current diaphragms.

12. The semiconductor laser according to claim 1, wherein the semiconductor laser has a multilayer structure and said mode-selective regions are formed in said multilayer structure.